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PATENT APPLICATION

Attorney Docket No. : 00 P 7661 US

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Date of Deposit : June 1, 2000

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

THE ASSISTANT COMMISSIONER FOR PATENTS
Washington, D.C. 20231

TRANSMITTAL LETTER FOR NEW APPLICATION

Sir:

Transmitted herewith for filing is a(n) ☒ Original patent application.
☒ Utility ☐ Design ☐ Continuation-in-part application

INVENTOR(S): Mark Clark, Mark Skrzynski and Florian Trinkwalder

TITLE: METHOD FOR ADDING EXTENSIONS TO THE GRAMMAR FOR ASN.1 WITHOUT
MODIFYING THE BASIC COMPILER AND CODE GENERATOR

Enclosed are with this transmittal letter (which is being sent in duplicate) are the following:

- ☒ Ten (10) page specification.
☒ Three (3) sheets of drawings ☐ formal drawings ☒ informal drawings (one set)
☒ The Declaration and Power of Attorney ☒ signed ☐ unsigned
☒ An Assignment Transmittal and Assignment of the invention to: Siemens Information and Communication Networks, Inc.
☒ Filing fee has been calculated as shown below (other than small entity):

For	Number Filed	Number Extra	Rate	Additional Fees
Total Claims	18 - 20	= 0	x \$ 18	\$ 0.00
Indep. Claims	4 - 3	= 1	x \$ 78	\$ 78.00
<input type="checkbox"/> First Presentation of a Multiple Dependent Claim			x \$260	\$-0-
			Basic filing Fee	\$690.00
			Total	\$768.00

Please charge my Deposit Account No. 19-2179 in the amount of \$ 768.00. The Commissioner is hereby authorized to charge any fees that may be required, or credit any overpayment to Deposit Account No. 19-2179 pursuant to 37 CFR 1.25. A duplicate copy of this sheet is enclosed.

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Atty Docket No. 00 P 7661 US

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

This is a U.S. Patent Application for:

**TITLE: METHOD FOR ADDING EXTENSIONS TO THE GRAMMAR FOR
ASN.1 WITHOUT MODIFYING THE BASIC COMPILER AND CODE
GENERATOR**

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FIELD OF THE INVENTION

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DESCRIPTION OF THE RELATED ART

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The basic ASN.1 compiler supports only X.680 grammar constructs. Typically, each extension has been supported through the development of an entirely new compiler. However, writing a compiler is relatively expensive and

5 Typically, this has required the user to purchase a new compiler which, again, is relatively expensive. Alternatively, the user can manually convert the new grammar constructs into those that are supported by the old compiler.

These and other problems in the prior art are overcome in large part by a system and method according to the present invention. A computer system is provided including a software program that reads source files that contain extended grammar constructs of ASN.1 and generates a new file that is a translation of the input file without the extended constructs. The new file contains only the basic ASN.1 constructs. The new file may then be compiled using a standard ASN.1 compiler.

A computer system according to an implementation of the invention implements a translator and a compiler for compiling a machine readable language. When a source file is provided, the system performs a line-by-line compare to determine if the file contains extended grammar constructs of the language. If not, then the source file is compiled. If so, however, then the source file is input to the translator to translate into basic grammar constructs.

A better understanding of the invention is obtained when the following detailed description is considered in conjunction with the following drawings in which:

FIG. 1 is a diagram illustrating a system according to an
30 implementation of the invention;

FIG. 2 is a diagram schematically illustrating operation of an embodiment of the invention;

FIG. 3 is a diagram illustrating a translator according to an embodiment

of the invention; and

FIG. 4 is a flowchart illustrating operation of an embodiment of the invention.

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DETAILED DESCRIPTION OF THE INVENTION

FIGS. 1- 4 illustrate an improved system and method for compiling ASN.1 grammar constructs. A computer system is provided including a software program that reads source files that contain extended grammar constructs of ASN.1 and generates a new file that is a translation of the input
10 file without the extended constructs. The new file contains only the basic ASN.1 constructs. The new file is then compiled using a standard ASN.1 compiler.

An exemplary processing system according to an implementation of the invention is shown in FIG. 1. As will be described in greater detail below,
15 the system 102 may be embodied as an H.323 terminal or a general purpose computer system. In particular, the system may be embodied as a personal computer, such as an x86 compatible personal computer or an Apple Macintosh G4. The computer 102 includes a processor 11 adapted to implement computer code according to the present invention. As shown in
20 the figure, a compiler 106 and a translator or precompiler 102 are resident.

Operation of an embodiment of the present invention is illustrated schematically with reference to FIG. 2. A source file 100 includes extended grammar constructs of ASN.1. Thus, the extended source file may include grammar constructs from X.68x (e.g., X.680, X.681, etc.). The extended
25 source file 100 is input to the translator unit 102. The translator unit 102 may include one or more databases that store conversion tables of the extended and non-extended ASN.1 grammar constructs. The translator unit 102 outputs a basic source file 104. The basic source file 104 includes only grammar constructs supported by the basic compiler, such as only X.680
30 constructs. The basic source file 104 is input to the compiler unit 106. The compiler unit 106 may be any standard compiler that supports only the basic constructs. However, since the source file 100 has been translated into the source file 104, the compiler 106 is able to produce a compiled executable file

108.

It is noted that the precompiler or translator 102 may be implemented having differing or even multiple configurable levels of precompilation. For example, the compiler 106 may support X.680 and X.681 constructs; in that
5 case, the precompiler 102 need only implement X.682 and higher precompilation.

An exemplary translator or precompiler 102 is illustrated with reference to FIG. 3. As shown, the translator 102 includes a plurality of lookup tables 404a-404n. The lookup tables 404a-404n include entries for particular
10 grammar extensions 406a-406n, and their corresponding basic grammar constructs 408a-408n. As will be explained in greater detail below, the translator 102 accesses the appropriate lookup table for the basic grammar constructs once the particular extension is identified.

In particular, FIG. 4 illustrates a flowchart according to a specific
15 embodiment of the invention. In a step 502, the system reads a source file 100. In a step 504, the system determines whether the file contains the basic grammar or whether it also contains extended grammar constructs. For example, the system may access one or more of the lookup tables 404a-404n and make a line-by-line comparison of the source file to make this
20 determination. If the file contains only basic grammar constructs, then in a step 506, the file 100 is compiled using the compiler 106. Otherwise, in a step 508, the system accesses the lookup tables in the translator 102 and performs the appropriate translation of the grammar into the basic grammar constructs. In a step 510, the system generates the new basic source file,
25 and may save the file to disk in a step 512. Finally, in step 506, the new source file is compiled using the compiler 106.

The following examples illustrate files that are translated from extended grammar constructs to the basic grammar constructs only:

EXAMPLE 1:

5 With Extensions

```
BEGIN
  SIGNED { ToBeSigned } ::= SEQUENCE {
10    toBeSigned      ToBeSigned,
    algorithmOID OBJECT IDENTIFIER,
    signature        BIT STRING
  }

15  H235CertificateSignature ::=SEQUENCE
  {
    argument      Argument,
    signature      SIGNED { EncodedReturnSig },
    ...
  }

20  Argument ::= INTEGER
  EncodedReturnSig ::= NULL

  END -- of Test-ASN
```

25 Without Extensions

```
Test-ASN

30  DEFINITIONS AUTOMATIC TAGS ::=
  BEGIN

    H235CertificateSignature ::=SEQUENCE
35  {
    argument      Argument,
    signature      SEQUENCE {
                                toBeSigned      EncodedReturnSig,
                                algorithmOID OBJECT IDENTIFIER,
                                signature        BIT STRING
40                                },
    ...
  }

  Argument ::= INTEGER
45  EncodedReturnSig ::= NULL

  END -- of Test-ASN
```

EXAMPLE 2

50

With extensions

```
Test-ASN

55  DEFINITIONS AUTOMATIC TAGS ::=
  BEGIN
    TESTOPERATION ::= CLASS
```

```

    {
        &arguments Arguments OPTIONAL
    }
    WITH SYNTAX
5    {
        [ARGUMENTS                &arguments]
    }

10    Arguments ::= CHOICE
    {
        argument1    INTEGER,
        argument2    INTEGER,
        argument3    INTEGER,
15        argument4    INTEGER,
        argument5    INTEGER,
        argument6    INTEGER,
    }

20    myTestOperation TESTOPERATION ::=
    {
        ARGUMENTS
    }

25    TestOperationSet TESTOPERATION ::= {myTestOperation}

    myTest ::= SEQUENCE
30    {
        arguments TESTOPERATION.&arguments({TestOperationSet})
    }

    END -- of Test-ASN

35    Without extensions

    Test-ASN

40    DEFINITIONS AUTOMATIC TAGS ::=
    BEGIN

        myTest ::= SEQUENCE
45    {
        arguments Arguments
    }

        Arguments ::= CHOICE
50    {
        argument1    INTEGER,
        argument2    INTEGER,
        argument3    INTEGER,
        argument4    INTEGER,
55        argument5    INTEGER,
        argument6    INTEGER,
    }

    END -- of Test-ASN

60
```

The invention described in the above detailed description is not intended to be limited to the specific form set forth herein, but is intended to cover such alternatives, modifications and equivalents as can reasonably be included within the spirit and scope of the appended claims.

WHAT IS CLAIMED IS:

1 1. A system, comprising:
2 a translator adapted to translate between extended grammar constructs of a
3 machine readable language and basic grammar constructs of said machine readable
4 language; and
5 a compiler coupled to receive an output of said translator for compiling code
6 written in said basic grammar constructs.

1 2. A system in accordance with claim 1, said machine readable language
2 comprising the Abstract Syntax Notation One (ASN.1) standard.

1 3. A system in accordance with claim 2, said basic grammar constructs
2 comprising X.680 grammar constructs.

1 4. A system in accordance with claim 3, said extended grammar constructs
2 comprising at least one of X.681, X.682, or X.683 grammar constructs.

1 5. A system in accordance with claim 4, said translator comprising one or
2 more lookup tables.

1 6. A method, comprising:
2 providing a first source file, said first source file including extended grammar
3 constructs of a machine readable language;
4 translating said first source file into a second source file, said second source
5 file containing only basic grammar constructs of said machine readable language;
6 and
7 compiling said second source file using a compiler adapted to compile basic
8 grammar constructs.

1 7. A method in accordance with claim 6, said machine readable language
2 being Abstract Syntax Notation One (ASN.1).

1 8. A method in accordance with claim 7, said first source file comprising at

2 least one of X.681, X.682, or X.683 grammar constructs.

1 9. A method in accordance with claim 8, said second source file comprising
2 X.680 grammar constructs.

1 10. A method in accordance with claim 9, said translating comprising
2 accessing a lookup table for equivalent constructs.

1 11. A method, comprising:
2 providing a translator adapted to translate between extended grammar
3 constructs of a machine readable language and basic grammar constructs of said
4 machine readable language; and
5 providing a compiler coupled to receive an output of said translator for
6 compiling code written in said basic grammar constructs.

1 12. A method in accordance with claim 11, said machine readable language
2 comprising the Abstract Syntax Notation One (ASN.1) standard.

1 13. A method in accordance with claim 12, said basic grammar constructs
2 comprising X.680 grammar constructs.

1 14. A method in accordance with claim 13, said extended grammar
2 constructs comprising at least one of X.681, X.682, or X.683 grammar constructs.

1 15. A method in accordance with claim 14, said translator comprising one or
2 more lookup tables.

1 16. A computer-readable computer program product, comprising:
2 computer-readable program code adapted to receive and translate extended
3 grammar constructs of a computer-readable program language into basic grammar
4 constructs of said computer-readable program language for output to a compiler of
5 program code written in said basic grammar constructs.

1 17. A computer-readable computer program product of claim 16, wherein
2 said computer-readable program language comprises an Abstract Syntax Notation
3 One (ASN.1) language.

1 18. A computer-readable computer program product of claim 16, wherein
2 said basic grammar constructs comprise X.680 grammar constructs, and wherein
3 said extended grammar constructs comprise at least one of X.68x grammar
4 constructs (where x is greater than or equal to 1).

ABSTRACT OF THE DISCLOSURE

A processing system (100) implements a translator (102) and a compiler (106) for compiling a machine readable language. When a source file (104) is
5 provided, the system performs a line-by-line compare to determine if the file contains extended grammar constructs (e.g., X.68x, where x is greater than or equal to 1) of the language, such as an ASN.1 standard language. If not, then the source file (104) is compiled. If so, however, then the source file (104) is input to the translator (102) to translate into basic grammar constructs (e.g., X.680).

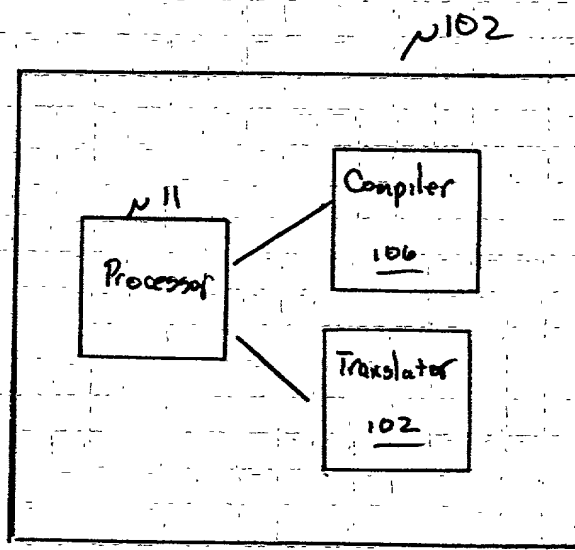


FIG. 1

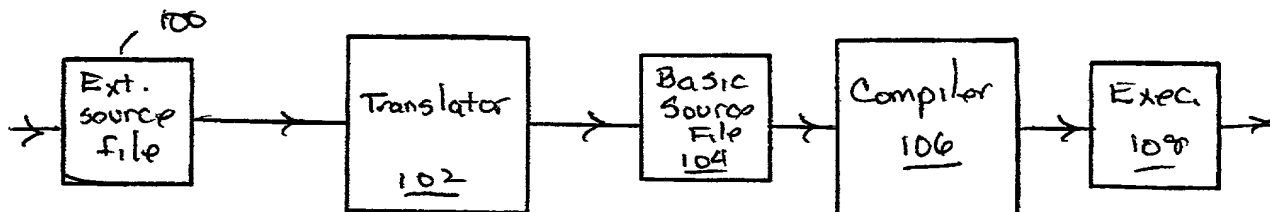


FIG. 2

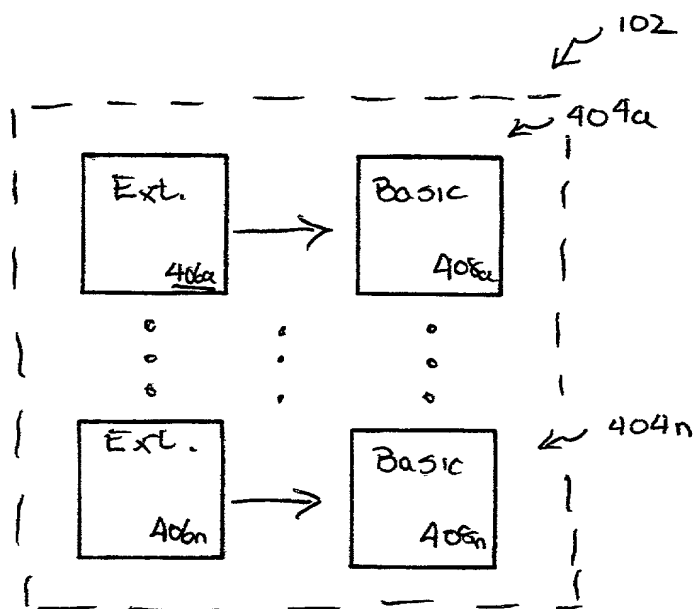


FIG. 3

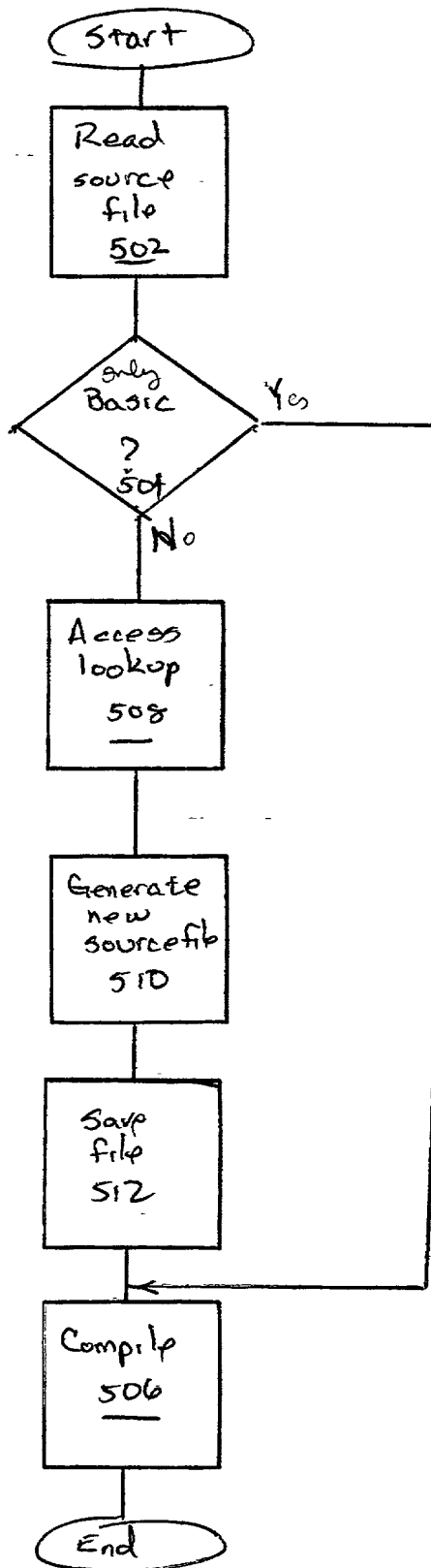


FIG. 4

DECLARATION FOR PATENT APPLICATION & POWER OF ATTORNEY

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name,

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

**METHOD FOR ADDING EXTENSIONS TO THE GRAMMAR FOR ASN.1
WITHOUT MODIFYING THE BASIC COMPILER AND CODE GENERATOR**

the specification of which (check one)

X is attached hereto.

___ was filed on _____ as Application Serial No.

and was amended on _____ (if applicable)

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose all information known to me to be material to patentability as defined in Title 37, Code of Federal Regulations § 1.56.

I hereby claim foreign priority benefits under Title 35, United States Codes, § 119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

PRIOR FOREIGN APPLICATION(S)

Priority claimed

(Number)	(Country)	(Day/month/year filed)	Yes	No
(Number)	(Country)	(Day/month/year filed)	Yes	No

I hereby claim the benefits under Title 35, United States Code, § 120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, § 112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, § 1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

(Application Serial No.)	(Filing date)	(Status) (patented,pending,abandoned)
(Application Serial No.)	(Filing date)	(Status) (patented,pending,abandoned)

Power of Attorney: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith.

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I hereby declare that all statements made herein on my own knowledge are true and that all statements made on information and belief are believed to be true, and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false

statements may jeopardize the validity of the application or any patent issuing thereon.

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